Exhibit E

Cellular Communication Technologies LLC v. Apple Inc., et al.

EXHIBIT D TO PLAINTIFF'S SECOND SUPPLEMENTAL INFRINGEMENT CONTENTIONS

U.S. Pat. No. 7,941,174	'174 APPLE ACCUSED PRODUCTS[1]
1. A method for operating a radio communication system in which a subscriber station is assigned a plurality of codes for transmitting messages, comprising:	Apple, AT&T, and T-Mobile make, use, sell, offer to sell, and/or import the '174 Apple Accused Products[2], each of which is a cellular device that includes and performs the features and capabilities described in this claim. Plaintiff contends that each Defendant directly infringes this claim because it makes, uses, sells, offers to sell, and/or imports the '174 Apple Accused Products, each of which includes and/or practices each and every element of this claim. Additionally, each Defendant indirectly infringes this claim by (1) inducing, with knowledge of the patent (at least by virtue of the patent's disclosure to ETSI), its customers' use of the '174 Apple Accused Products to practice each and every one of the following claim elements with knowledge that such practice infringes this claim and intent to cause such infringement (as evidenced for example, in user guides and other instructional materials provided by each Defendant such as instructions to operate the Accused Product within a provided service area), and/or (2) contributing to direct infringement by customers that use the '174 Apple Accused Products to practice each and every one of the following claim elements, with knowledge that the infringing features of the '174 Apple Accused Products have no substantial non-infringing uses (by their nature as proprietary hardware components and software instructions that work in concert to perform specific, intended functions) and that the combination for which such features were made infringes this claim. Each '174 Apple Accused Product is a subscriber station that performs a method as set forth in this claim. Specifically, each '174 Apple Accused Product is a

[1] Discovery in this case is ongoing. Accordingly, Plaintiff expects that these contentions may be subject to supplementation and/or amendment after further discovery and disclosure of Defendant's non-infringement positions in order to focus the issues in this case. For example, Plaintiff may supplement these contentions in response to information learned during discovery to rebut allegations of non-infringement under the doctrine of equivalents. Additionally, Plaintiff expects that these contentions may be subject to amendment or supplementation to identify and accuse additional devices released, developed, or made available after the date on which these contentions are served.

[2] The '174 Apple Accused Products include the following products: iPhone 4, iPhone 4s. iPhone 5, iPhone 5c, iPhone 5s, iPad 2, iPad (third generation a/k/a "the new iPad" or "iPad 3"), iPad (fourth generation a/k/a "the iPad with Retina display" or iPad 4"), iPad Mini, iPad Mini with Retina display, iPad Air, iPhone 6, and iPhone 6 Plus. Evidence supporting the use of relevant technology contained within this chart is listed in Appendix D-1.

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	cellular device that includes hardware and software (including memory, one or more processors, radios, firmware, and drivers) configured to support and provide wireless communications in a Universal Mobile Telecommunications System (UMTS) Terrestrial Radio Access Network (UTRAN) environment utilizing HSPA. As such, each '174 Apple Accused Product is compliant with and supports technical specifications published by 3GPP and ETSI for UMTS technology, including TS 25.213, TS 25.215, TS 25.133, and TS 25.214.[3] Indeed, the '174 patent is essential to compliance with UMTS standards.[4] In the UMTS network environment, a subscriber station (or user equipment, "UE"), such as each of the '174 Apple Accused Products, is assigned a plurality of codes (e.g., DPCCH, DPDCH, HS-DPCCH, E-DPCCH, and E-DPDCH codes) for transmitting wireless messages. Such codes are defined and described in technical specifications published by 3GPP and ETSI for UMTS technology.[5]
determining a transmit power difference which is to be maintained by the subscriber station between on one hand a total maximum transmit power of the subscriber station for the codes and on another hand a total transmit power of the subscriber station for the codes at a start of a message transmission using a first one of the codes.	Each '174 Apple Accused Product determines a transmit power difference which is to be maintained by the subscriber station (i.e., the Accused Product) between, on one hand, a total maximum transmit power of the subscriber station for the codes, and on another hand, a total transmit power of the subscriber station for the codes at a start of a message transmission using a first one of the codes. In a UMTS system, each UE is assigned multiple physical channels represented by codes. Such physical channels may include DPCCH, DPDCH, HS-DPCCH, E-DPCCH, and E-DPDCH, each of which is represented by a code.[6] Additionally, each UE is capable of measuring transmission power headroom and

[3] *See* TS 25.213 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125213/09.02.00_60/ts_125213v090200p.pdf; TS 25.215 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125215/09.02.00_60/ts_125215v090200p.pdf; TS 25.133 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125100_125199/125133/09.07.00_60/ts_125133v090700p.pdf; TS 25.214 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125214/09.07.00_60/ts_125214v090700p.pdf.

[4] http://ipr.etsi.org/IPRDetails.aspx?IPRD_ID=700&IPRD_TYPE_ID=2&MODE=2 (last accessed Mar. 20, 2014).

[5] TS 25.213 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125213/09.02.00_60/ts_125213v090200p.pdf, at 8-9.

[6] *Id.*

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	reporting available power headroom for particular channels to nodes in the UMTS network. The reported UE transmission power headroom measurement is an estimate of the average value of the UE transmission power headroom over a 100ms period.[7] UE transmission power headroom (UPH) is defined in TS 25.215 as follows:[8] 5.1.14 UE transmission power headroom **Definition**: For each uplink DPCCH, UE transmission power headroom (UPH) is the ratio of the maximum UE transmission power and the DPCCH code power, and shall be calculated as following: $UPH = P_{\max,tx} / P_{DPCCH}$ where: $P_{max,tx}$ = min {*Maximum allowed UL TX Power*, P_{max}} is the UE maximum transmission power; *Maximum allowed UL TX Power* is set by UTRAN and defined in [14]; P_{max} is the UE nominal maximum output power according to the UE power class and specified in [18] table 6.1; P_{DPCCH} is the transmitted code power on the DPCCH. The reference point for the UE transmission power headroom shall be the antenna connector of the UE. **Applicable for**: CELL_FACH intra, CELL_DCH intra As explained above, each '174 Apple Accused Product is configured to support and provide communications in a UMTS environment and therefore complies with UMTS technical specifications. Thus, when communicating in a UMTS environment, each '174 Apple Accused Product determines a UPH by receiving and interpreting information from the NodeB that factors in the power ratio between the E-DPDCD and DPCCH as required by $\beta_{ed,k,min}/\beta_c$:[9] - Any additional scaling of the total transmit power as described above shall be such that the power ratio between DPCCH and DPDCH, between DPCCH and HS-DPCCH, and between DPCCH and E-DPCCH, remains as required by

[7] TS 25.133 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125100_125199/125133/09.07.00_60/ts_125133v090700p.pdf, at 102.
[8] TS 25.215 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125215/09.02.00_60/ts_125215v090200p.pdf, at 12.
[9] TS 25.214 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125214/09.07.00_60/ts_125214v090700p.pdf at 33-34.

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	sub-clauses 5.1.2.5, 5.1.2.5A and 5.1.2.5B.1, and such that the power ratio between each E-DPDCH and DPCCH remains as required by $\beta_{ed,k,min}/\beta_c$ if DTX is not used on E-DPDCH. Any slot-level scaling of β_{ed} or DTX of E-DPDCH as described above is applied at layer 1 only and is transparent to higher layers. Thus the UE determines the transmit power difference between a total maximum transmit power of the subscriber station for the codes ($P_{max,tx}$, a constant, or in the alternative, the total allocated power allocated for the codes) and a total transmit power of the subscriber station for the codes at the start of a message transmission using one of the codes (e.g., P_{DPCCH}). As explained in the cited portion of TS 25.214 shown above, the UE maintains this transmit power difference via a power control procedure applicable at the start of a message transmission on a first code: 5.1.2 DPCCH/DPDCH 5.1.2.1 General The initial uplink DPCCH transmit power is set by higher layers. Subsequently the uplink transmit power control procedure simultaneously and independently controls the power of a DPCCH on each activated uplink frequency and its corresponding DPDCHs (if present). The relative transmit power offset between DPCCH and DPDCHs is determined by the network and is computed according to subclause 5.1.2.5 using the gain factors signalled to the UE using higher layer signalling. The operation of the inner power control loop, described in sub clause 5.1.2.2, adjusts the power of the DPCCH and DPDCHs by the same amount, provided there are no changes in gain factors. Additional adjustments to the power of the DPCCH associated with the use of compressed mode are described in sub clause 5.1.2.3. Any change in the uplink DPCCH transmit power shall take place immediately before the start of the pilot field on the DPCCH. The change in DPCCH power with respect to its previous value is derived by the UE and is denoted by Δ_{DPCCH} (in dB). The previous value of DPCCH power shall be that used in the previous slot, except in the event of an interruption in transmission due to the use of compressed mode or discontinuous uplink DPCCH transmission operation, when the previous value shall be that used in the last slot before the transmission gap. During the operation of the uplink power control procedure the UE transmit power shall not exceed a maximum allowed value which is the lower out of the maximum output power of the terminal power class and a value which may be set by higher layer signalling. Uplink power control shall be performed while the UE transmit power is below the maximum allowed output power. The provisions for power control at the maximum allowed value and below the required minimum output power (as defined in [7]) are described in sub-clause 5.1.2.6.

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5.1.2.6 Maximum and minimum power limits

When E-DCH is not configured, in the case that the total UE transmit power (after applying DPCCH power adjustments and gain factors) would exceed the maximum allowed value, the UE shall apply additional scaling to the total transmit power so that it is equal to the maximum allowed power. This additional scaling shall be such that the power ratio between DPCCH and DPDCH and also DPCCH and HS-DPCCH remains as required by sub-clause 5.1.2.5 and 5.1.2.5A.

When E-DCH is configured on a single frequency or E-DCH is configured on multiple frequencies but Secondary_EDCH_Cell_Active is 0,

- If the total UE transmit power (after applying DPCCH power adjustments and gain factors) would exceed the maximum allowed value, the UE shall firstly reduce all the E-DPDCH gain factors $\beta_{ed,k}$ by an equal scaling factor to respective values $\beta_{ed,k,reduced}$ so that the total transmit power would be equal to the maximum allowed power.

- Also if $E\text{-}TFCI_i$ is greater than $E\text{-}TFCI_{ec,boost}$, UE shall reduce only E-DPDCH gain factors to respective values $\beta_{ed,k,reduced}$ and E-DPCCH is transmitted using original β_{ec} which is not recalculated according to the reduced E-DPDCH gain factors. After calculating the reduced E-DPDCH gain factors, if $E\text{-}TFCI_i$ is smaller than or equal to $E\text{-}TFCI_{ec,boost}$, quantization according to table 1B.2 in [3] subclause 4.2.1.3 may be applied, or if $E\text{-}TFCI_i$ is greater than $E\text{-}TFCI_{ec,boost}$, quantization according to table 1B.2B in [3] subclause 4.2.1.3 may be applied, where each $\beta_{ed,k,reduced}$ is quantized such that $\beta_{ed,k}/\beta_c$ is the largest quantized value for which the condition $\beta_{ed,k} \leq \beta_{ed,k,reduced}$ holds. In case a DPDCH is configured, if any $\beta_{ed,k,reduced}/\beta_c$ is less than the smallest quantized value of Table 1B.2 in [3] subclause 4.2.1.3, DTX may be used on that E-DPDCH (E-DPCCH is, however still transmitted using β_{ec}). In case no DPDCH is configured and regardless of the applied uplink modulation, if any $\beta_{ed,k,reduced}/\beta_c$ is less than $\beta_{ed,k,reduced,min}/\beta_c$, that $\beta_{ed,k}$ shall be set to $\beta_{ed,k,min}$ such that $\beta_{ed,k,min}/\beta_c = \min(\beta_{ed,k,reduced,min}/\beta_c, \beta_{ed,k,original}/\beta_c)$, where $\beta_{ed,k,original}$ denotes the E-DPDCH gain factor before reduction and $\beta_{ed,k,reduced,min}$ is configurable by higher layers.

- In the following cases, the UE shall then apply additional scaling to the total transmit power so that it is equal to the maximum allowed power:

  - if a DPDCH is configured and the total UE transmit power would still exceed the maximum allowed value even though DTX is used on all E-DPDCHs;

  - if no DPDCH is configured and the total UE transmit power would still exceed the maximum allowed value even though $\beta_{ed,k}$ is equal to $\beta_{ed,k,min}$ for all k.

The UE, when receiving a command to scale the transmission power, distributes the increment/decrement among all codes such that ratios are always maintained according to their respective conditions. Hence, the UE, or the processor within the UE, is programmed to maintain a determined transmit power difference.

Alternatively, CCE contends that this claim element is met under the doctrine of equivalents because above-described features of the Accused Products perform substantially the same function recited in this element, in substantially the same way to achieve substantially the same result. Any alleged differences between

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	the above-described features and the recited element are insubstantial and immaterial to infringement.
6. The method as claimed in claim 6, wherein said determining of the transmit power difference is performed by the subscriber station.	*See* analysis of claim 1, which is incorporated herein by reference. As each '174 Apple Accused Product is compliant with technical specifications published by 3GPP and ETSI for UMTS technology, each '174 Apple Accused Product performs the determining of the transmit power difference by virtue of receiving and interpreting information from the NodeB that factors in the power ratio between the E-DPDCD and DPCCH as required by $\beta_{ed,k,min}/\beta_c$.
9. A method for operating a radio communication system in which a subscriber station is assigned a plurality of codes for transmitting messages, comprising:	Each Defendant makes, uses, sells, offers to sell, and/or imports the '174 Apple Accused Products, each of which is a cellular device that includes and performs the features and capabilities described in this claim. Plaintiff contends that each Defendant directly infringes this claim because it makes, uses, sells, offers to sell, and/or imports the '174 Apple Accused Products, each of which includes and/or practices each and every element of this claim. Additionally, each Defendant indirectly infringes this claim by (1) inducing, with knowledge of the patent (at least by virtue of the patent's disclosure to ETSI), its customers' use of the '174 Apple Accused Products to practice each and every one of the following claim elements with knowledge that such practice infringes this claim and intent to cause such infringement (as evidenced for example, in user guides and other instructional materials provided by each Defendant such as instructions to operate each of the Accused Products within a provided service area), and/or (2) contributing to direct infringement by customers that use the '174 Apple Accused Products to practice each and every one of the following claim elements, with knowledge that the infringing features of the '174 Apple Accused Products have no substantial non-infringing uses and that the combination for which such features were made infringes this claim. Each '174 Apple Accused Product is a subscriber station that performs a method as set forth in this claim. Specifically, each '174 Apple Accused Product is a

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	cellular device that includes hardware and software (including memory, one or more processors, radios, firmware, and drivers) configured to support and provide wireless communications in a Universal Mobile Telecommunications System (UMTS) Terrestrial Radio Access Network (UTRAN) environment. As such, each '174 Apple Accused Product is compliant with technical specifications published by 3GPP and ETSI for UMTS technology, including TS 25.213, TS 25.215, TS 25.133, and TS 25.214.[10] Indeed, the '174 patent is essential to compliance with UMTS standards.[11] In the UMTS network environment, a subscriber station (or user equipment, "UE"), such as each of the '174 Apple Accused Products, is assigned a plurality of codes (e.g., DPCCH, DPDCH, HS-DPCCH, E-DPCCH, and E-DPDCH codes) for transmitting wireless messages. Such codes are defined and described in technical specifications published by 3GPP and ETSI for UMTS technology.[12]
maintaining a previously determined transmit power difference by the subscriber station between on one hand a total maximum power of the subscriber station for the codes and on another hand a total transmit power of the subscriber station for the codes at a start of a message transmission using a first one of the codes.	Each '174 Apple Accused Product maintains a previously determined transmit power difference by the subscriber station (i.e., the Accused Product) between, on one hand, a total maximum transmit power of the subscriber station for the codes, and on another hand, a total transmit power of the subscriber station for the codes at a start of a message transmission using a first one of the codes. In a UMTS system, each UE is assigned multiple physical channels represented by codes. Such physical channels may include DPCCH, DPDCH, HS-DPCCH, E-DPCCH, and E-DPDCH, each of which is represented by a code.[13] Additionally, each UE is capable of measuring transmission power headroom and reporting available power headroom for particular channels to nodes in the

[10] *See* TS 25.213 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125213/09.02.00_60/ts_125213v090200p.pdf; TS 25.215 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125215/09.02.00_60/ts_125215v090200p.pdf; TS 25.133 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125100_125199/125133/09.07.00_60/ts_125133v090700p.pdf; TS 25.214 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125214/09.07.00_60/ts_125214v090700p.pdf.

[11] http://ipr.etsi.org/IPRDetails.aspx?IPRD_ID=700&IPRD_TYPE_ID=2&MODE=2 (accessed Dec. 28, 2013).

[12] TS 25.213 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125213/09.02.00_60/ts_125213v090200p.pdf, at 8-9.

[13] *Id.*

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UMTS network. The reported UE transmission power headroom measurement is an estimate of the average value of the UE transmission power headroom over a 100ms period.[14]

UE transmission power headroom (UPH) is defined in TS 25.215 as follows:[15]

5.1.14 UE transmission power headroom

Definition	For each uplink DPCCH, UE transmission power headroom (UPH) is the ratio of the maximum UE transmission power and the DPCCH code power, and shall be calculated as following: $UPH = P_{\max,tx} / P_{DPCCH}$ where: $P_{max,tx}$ = min {*Maximum allowed UL TX Power*, P_{max}} is the UE maximum transmission power; *Maximum allowed UL TX Power* is set by UTRAN and defined in [14]; P_{max} is the UE nominal maximum output power according to the UE power class and specified in [18] table 6.1; P_{DPCCH} is the transmitted code power on the DPCCH. The reference point for the UE transmission power headroom shall be the antenna connector of the UE.
Applicable for	CELL_FACH intra, CELL_DCH intra

As explained above, each '174 Apple Accused Product is configured to support and provide communications in a UMTS environment and therefore complies with UMTS technical specifications. Thus, when communicating in a UMTS environment, each '174 Apple Accused Product determines a UPH by receiving and interpreting information from the NodeB that factors in the power ratio between the E-DPDCD and DPCCH as required by $\beta_{ed,k,min}/\beta_c$:[16]

- Any additional scaling of the total transmit power as described above shall be such that the power ratio between DPCCH and DPDCH, between DPCCH and HS-DPCCH, and between DPCCH and E-DPCCH, remains as required by sub-clauses 5.1.2.5, 5.1.2.5A and 5.1.2.5B.1, and such that the power ratio between each E-DPDCH and DPCCH remains as required by $\beta_{ed,k,min}/\beta_c$ if DTX is not used on E-DPDCH. Any slot-level scaling of β_{ed} or DTX of E-DPDCH as described above is applied at layer 1 only and is transparent to higher layers.

[14] TS 25.133 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125100_125199/125133/09.07.00_60/ts_125133v090700p.pdf, at 102.
[15] TS 25.215 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125215/09.02.00_60/ts_125215v090200p.pdf, at 12.
[16] TS 25.214 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125214/09.07.00_60/ts_125214v090700p.pdf at 33-34.

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	Thus the UE determines and maintains the transmit power difference between a total maximum transmit power of the subscriber station for the codes ($P_{max,tx}$, a constant, or in the alternative, the total allocated power allocated for the codes) and a total transmit power of the subscriber station for the codes at the start of a message transmission using one of the codes (e.g., P_{DPCCH}). As explained in the cited portion of TS 25.214 shown above, the UE maintains this transmit power difference via a power control procedure applicable at the start of a message transmission on a first code: 5.1.2 DPCCH/DPDCH 5.1.2.1 General The initial uplink DPCCH transmit power is set by higher layers. Subsequently the uplink transmit power control procedure simultaneously and independently controls the power of a DPCCH on each activated uplink frequency and its corresponding DPDCHs (if present). The relative transmit power offset between DPCCH and DPDCHs is determined by the network and is computed according to subclause 5.1.2.5 using the gain factors signalled to the UE using higher layer signalling. The operation of the inner power control loop, described in sub clause 5.1.2.2, adjusts the power of the DPCCH and DPDCHs by the same amount, provided there are no changes in gain factors. Additional adjustments to the power of the DPCCH associated with the use of compressed mode are described in sub clause 5.1.2.3. Any change in the uplink DPCCH transmit power shall take place immediately before the start of the pilot field on the DPCCH. The change in DPCCH power with respect to its previous value is derived by the UE and is denoted by Δ_{DPCCH} (in dB). The previous value of DPCCH power shall be that used in the previous slot, except in the event of an interruption in transmission due to the use of compressed mode or discontinuous uplink DPCCH transmission operation, when the previous value shall be that used in the last slot before the transmission gap. During the operation of the uplink power control procedure the UE transmit power shall not exceed a maximum allowed value which is the lower out of the maximum output power of the terminal power class and a value which may be set by higher layer signalling. Uplink power control shall be performed while the UE transmit power is below the maximum allowed output power. The provisions for power control at the maximum allowed value and below the required minimum output power (as defined in [7]) are described in sub-clause 5.1.2.6.

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	5.1.2.6 Maximum and minimum power limits When E-DCH is not configured, in the case that the total UE transmit power (after applying DPCCH power adjustments and gain factors) would exceed the maximum allowed value, the UE shall apply additional scaling to the total transmit power so that it is equal to the maximum allowed power. This additional scaling shall be such that the power ratio between DPCCH and DPDCH and also DPCCH and HS-DPCCH remains as required by sub-clause 5.1.2.5 and 5.1.2.5A. When E-DCH is configured on a single frequency or E-DCH is configured on multiple frequencies but Secondary_EDCH_Cell_Active is 0, - If the total UE transmit power (after applying DPCCH power adjustments and gain factors) would exceed the maximum allowed value, the UE shall firstly reduce all the E-DPDCH gain factors $\beta_{ed,k}$ by an equal scaling factor to respective values $\beta_{ed,k,reduced}$ so that the total transmit power would be equal to the maximum allowed power. - Also if $E\text{-}TFCI_i$ is greater than $E\text{-}TFCI_{ec,boost}$, UE shall reduce only E-DPDCH gain factors to respective values $\beta_{ed,k,reduced}$ and E-DPCCH is transmitted using original β_{ec} which is not recalculated according to the reduced E-DPDCH gain factors. After calculating the reduced E-DPDCH gain factors, if $E\text{-}TFCI_i$ is smaller than or equal to $E\text{-}TFCI_{ec,boost}$, quantization according to table 1B.2 in [3] subclause 4.2.1.3 may be applied, or if $E\text{-}TFCI_i$ is greater than $E\text{-}TFCI_{ec,boost}$, quantization according to table 1B.2B in [3] subclause 4.2.1.3 may be applied, where each $\beta_{ed,k,reduced}$ is quantized such that $\beta_{ed,k}/\beta_c$ is the largest quantized value for which the condition $\beta_{ed,k} \leq \beta_{ed,k,reduced}$ holds. In case a DPDCH is configured, if any $\beta_{ed,k,reduced}/\beta_c$ is less than the smallest quantized value of Table 1B.2 in [3] subclause 4.2.1.3, DTX may be used on that E-DPDCH (E-DPCCH is, however still transmitted using β_{ec}). In case no DPDCH is configured and regardless of the applied uplink modulation, if any $\beta_{ed,k,reduced}/\beta_c$ is less than $\beta_{ed,k,reduced,min}/\beta_c$, that $\beta_{ed,k}$ shall be set to $\beta_{ed,k,min}$ such that $\beta_{ed,k,min}/\beta_c = \min(\beta_{ed,k,reduced,min}/\beta_c, \beta_{ed,k,original}/\beta_c)$, where $\beta_{ed,k,original}$ denotes the E-DPDCH gain factor before reduction and $\beta_{ed,k,reduced,min}$ is configurable by higher layers. - In the following cases, the UE shall then apply additional scaling to the total transmit power so that it is equal to the maximum allowed power: - if a DPDCH is configured and the total UE transmit power would still exceed the maximum allowed value even though DTX is used on all E-DPDCHs; - if no DPDCH is configured and the total UE transmit power would still exceed the maximum allowed value even though $\beta_{ed,k}$ is equal to $\beta_{ed,k,min}$ for all k. The UE, when receiving a command to scale the transmission power, distributes the increment/decrement among all codes such that ratios are always maintained according to their respective conditions. Hence, the UE, or the processor within the UE, is programmed to maintain a previously determined transmit power difference. Alternatively, CCE contends that this claim element is met under the doctrine of equivalents because above-described features of the Accused Products perform substantially the same function recited in this element, in substantially the same

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	way to achieve substantially the same result. Any alleged differences between the above-described features and the recited element are insubstantial and immaterial to infringement.
14. The method as claimed in claim 9, wherein said determining of the transmit power difference is performed by the subscriber station.	*See* analysis of claim 9, which is incorporated herein by reference. As each '174 Apple Accused Product is compliant with technical specifications published by 3GPP and ETSI for UMTS technology, each '174 Apple Accused Product performs the determining of the transmit power difference by virtue of receiving and interpreting information from the NodeB that factors in the power ratio between the E-DPDCD and DPCCH as required by $\beta_{ed,k,min}/\beta_c$.
18. A subscriber station for a radio communication system, the subscriber station assigned a plurality of codes for transmitting messages, comprising:	Each Defendant makes, uses, sells, offers to sell, and/or imports the '174 Apple Accused Products, each which is a cellular device that includes and performs the features and capabilities described in this claim. Plaintiff contends that each Defendant directly infringes this claim because it makes, uses, sells, offers to sell, and/or imports the '174 Apple Accused Products, each of which includes and/or practices each and every element of this claim. Each '174 Apple Accused Product is a subscriber station for a radio communication system, as set forth in this claim. Specifically, each '174 Apple Accused Product is a cellular device that includes hardware and software (including memory, one or more processors, radios, firmware, and drivers) configured to support and provide wireless communications in a Universal Mobile Telecommunications System (UMTS) Terrestrial Radio Access Network (UTRAN) environment. As such, each '174 Apple Accused Product is compliant with technical specifications published by 3GPP and ETSI for UMTS technology, including TS 25.213, TS 25.215, TS 25.133, and TS 25.214.[17] Indeed, the '174

[17] *See* TS 25.213 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125213/09.02.00_60/ts_125213v090200p.pdf; TS 25.215 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125215/09.02.00_60/ts_125215v090200p.pdf; TS 25.133 Technical Specification,

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	patent is essential to compliance with UMTS standards.[18] In the UMTS network environment, a subscriber station (or user equipment, "UE"), such as each of the '174 Apple Accused Products, is assigned a plurality of codes (e.g., DPCCH, DPDCH, HS-DPCCH, E-DPCCH, and E-DPDCH codes) for transmitting wireless messages. Such codes are defined and described in technical specifications published by 3GPP and ETSI for UMTS technology.[19]
at least one processor programmed to determine a transmit power difference which is to be maintained by the subscriber station between on one hand a total maximum transmit power of the subscriber station for the codes and on another hand a total transmit power of the subscriber station for the codes at a start of a message transmission using a first one of the codes.	Each '174 Apple Accused Product includes a processor programmed to determine a transmit power difference which is to be maintained by the subscriber station (i.e., the Accused Product) between, on one hand, a total maximum transmit power of the subscriber station for the codes, and on another hand, a total transmit power of the subscriber station for the codes at a start of a message transmission using a first one of the codes. In a UMTS system, each UE is assigned multiple physical channels represented by codes. Such physical channels may include DPCCH, DPDCH, HS-DPCCH, E-DPCCH, and E-DPDCH, each of which is represented by a code.[20] Additionally, each UE is capable of measuring transmission power headroom and reporting available power headroom for particular channels to nodes in the UMTS network. The reported UE transmission power headroom measurement is an estimate of the average value of the UE transmission power headroom over a 100ms period.[21] UE transmission power headroom (UPH) is defined in TS 25.215 as follows:[22]

http://www.etsi.org/deliver/etsi_ts/125100_125199/125133/09.07.00_60/ts_125133v090700p.pdf; TS 25.214 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125214/09.07.00_60/ts_125214v090700p.pdf.

[18] http://ipr.etsi.org/IPRDetails.aspx?IPRD_ID=700&IPRD_TYPE_ID=2&MODE=2 (accessed Dec. 28, 2013).

[19] TS 25.213 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125213/09.02.00_60/ts_125213v090200p.pdf, at 8-9.

[20] *Id.*

[21] TS 25.133 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125100_125199/125133/09.07.00_60/ts_125133v090700p.pdf, at 102.

[22] TS 25.215 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125215/09.02.00_60/ts_125215v090200p.pdf, at 12.

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5.1.14 UE transmission power headroom

Definition	For each uplink DPCCH, UE transmission power headroom (UPH) is the ratio of the maximum UE transmission power and the DPCCH code power, and shall be calculated as following: $UPH = P_{\max,tx} / P_{DPCCH}$ where: $P_{max,tx}$ = min {*Maximum allowed UL TX Power*, P_{max}} is the UE maximum transmission power; *Maximum allowed UL TX Power* is set by UTRAN and defined in [14]; P_{max} is the UE nominal maximum output power according to the UE power class and specified in [18] table 6.1; P_{DPCCH} is the transmitted code power on the DPCCH. The reference point for the UE transmission power headroom shall be the antenna connector of the UE.
Applicable for	CELL_FACH intra, CELL_DCH intra

As explained above, each '174 Apple Accused Product is configured to support and provide communications in a UMTS environment and therefore complies with UMTS technical specifications. Thus, when communicating in a UMTS environment, each '174 Apple Accused Product determines a UPH by receiving and interpreting information from the NodeB that factors in the power ratio between the E-DPDCD and DPCCH as required by $\beta_{ed,k,min}/\beta_c$:[23]

- Any additional scaling of the total transmit power as described above shall be such that the power ratio between DPCCH and DPDCH, between DPCCH and HS-DPCCH, and between DPCCH and E-DPCCH, remains as required by sub-clauses 5.1.2.5, 5.1.2.5A and 5.1.2.5B.1, and such that the power ratio between each E-DPDCH and DPCCH remains as required by $\beta_{ed,k,min}/\beta_c$ if DTX is not used on E-DPDCH. Any slot-level scaling of β_{ed} or DTX of E-DPDCH as described above is applied at layer 1 only and is transparent to higher layers.

Thus the UE determines the transmit power difference between a total maximum transmit power of the subscriber station for the codes ($P_{max,tx}$, a constant, or in the alternative, the total allocated power allocated for the codes) and a total transmit power of the subscriber station for the codes at the start of a message transmission using one of the codes (e.g., P_{DPCCH}). As explained in the cited portion of TS 25.214 shown above, the UE maintains this transmit power difference via a power control procedure applicable at the start of a message

[23] TS 25.214 Technical Specification, http://www.etsi.org/deliver/etsi_ts/125200_125299/125214/09.07.00_60/ts_125214v090700p.pdf at 33-34.

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	transmission on a first code: 5.1.2 DPCCH/DPDCH 5.1.2.1 General The initial uplink DPCCH transmit power is set by higher layers. Subsequently the uplink transmit power control procedure simultaneously and independently controls the power of a DPCCH on each activated uplink frequency and its corresponding DPDCHs (if present). The relative transmit power offset between DPCCH and DPDCHs is determined by the network and is computed according to subclause 5.1.2.5 using the gain factors signalled to the UE using higher layer signalling. The operation of the inner power control loop, described in sub clause 5.1.2.2, adjusts the power of the DPCCH and DPDCHs by the same amount, provided there are no changes in gain factors. Additional adjustments to the power of the DPCCH associated with the use of compressed mode are described in sub clause 5.1.2.3. Any change in the uplink DPCCH transmit power shall take place immediately before the start of the pilot field on the DPCCH. The change in DPCCH power with respect to its previous value is derived by the UE and is denoted by Δ_{DPCCH} (in dB). The previous value of DPCCH power shall be that used in the previous slot, except in the event of an interruption in transmission due to the use of compressed mode or discontinuous uplink DPCCH transmission operation, when the previous value shall be that used in the last slot before the transmission gap. During the operation of the uplink power control procedure the UE transmit power shall not exceed a maximum allowed value which is the lower out of the maximum output power of the terminal power class and a value which may be set by higher layer signalling. Uplink power control shall be performed while the UE transmit power is below the maximum allowed output power. The provisions for power control at the maximum allowed value and below the required minimum output power (as defined in [7]) are described in sub-clause 5.1.2.6.

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5.1.2.6 Maximum and minimum power limits

When E-DCH is not configured, in the case that the total UE transmit power (after applying DPCCH power adjustments and gain factors) would exceed the maximum allowed value, the UE shall apply additional scaling to the total transmit power so that it is equal to the maximum allowed power. This additional scaling shall be such that the power ratio between DPCCH and DPDCH and also DPCCH and HS-DPCCH remains as required by sub-clause 5.1.2.5 and 5.1.2.5A.

When E-DCH is configured on a single frequency or E-DCH is configured on multiple frequencies but Secondary_EDCH_Cell_Active is 0,

- If the total UE transmit power (after applying DPCCH power adjustments and gain factors) would exceed the maximum allowed value, the UE shall firstly reduce all the E-DPDCH gain factors $\beta_{ed,k}$ by an equal scaling factor to respective values $\beta_{ed,k,reduced}$ so that the total transmit power would be equal to the maximum allowed power.

- Also if $E\text{-}TFCI_i$ is greater than $E\text{-}TFCI_{ec,boost}$, UE shall reduce only E-DPDCH gain factors to respective values $\beta_{ed,k,reduced}$ and E-DPCCH is transmitted using original β_{ec} which is not recalculated according to the reduced E-DPDCH gain factors. After calculating the reduced E-DPDCH gain factors, if $E\text{-}TFCI_i$ is smaller than or equal to $E\text{-}TFCI_{ec,boost}$, quantization according to table 1B.2 in [3] subclause 4.2.1.3 may be applied, or if $E\text{-}TFCI_i$ is greater than $E\text{-}TFCI_{ec,boost}$, quantization according to table 1B.2B in [3] subclause 4.2.1.3 may be applied, where each $\beta_{ed,k,reduced}$ is quantized such that $\beta_{ed,k}/\beta_c$ is the largest quantized value for which the condition $\beta_{ed,k} \leq \beta_{ed,k,reduced}$ holds. In case a DPDCH is configured, if any $\beta_{ed,k,reduced}/\beta_c$ is less than the smallest quantized value of Table 1B.2 in [3] subclause 4.2.1.3, DTX may be used on that E-DPDCH (E-DPCCH is, however still transmitted using β_{ec}). In case no DPDCH is configured and regardless of the applied uplink modulation, if any $\beta_{ed,k,reduced}/\beta_c$ is less than $\beta_{ed,k,reduced,min}/\beta_c$, that $\beta_{ed,k}$ shall be set to $\beta_{ed,k,min}$ such that $\beta_{ed,k,min}/\beta_c = \min(\beta_{ed,k,reduced,min}/\beta_c, \beta_{ed,k,original}/\beta_c)$, where $\beta_{ed,k,original}$ denotes the E-DPDCH gain factor before reduction and $\beta_{ed,k,reduced,min}$ is configurable by higher layers.

- In the following cases, the UE shall then apply additional scaling to the total transmit power so that it is equal to the maximum allowed power:

  - if a DPDCH is configured and the total UE transmit power would still exceed the maximum allowed value even though DTX is used on all E-DPDCHs;

  - if no DPDCH is configured and the total UE transmit power would still exceed the maximum allowed value even though $\beta_{ed,k}$ is equal to $\beta_{ed,k,min}$ for all k.

The UE, when receiving a command to scale the transmission power, distributes the increment/decrement among all codes such that ratios are always maintained according to their respective conditions. Hence, the UE, or the processor within the UE, is programmed to maintain a determined transmit power difference.

Alternatively, CCE contends that this claim element is met under the doctrine of equivalents because above-described features of the Accused Products perform substantially the same function recited in this element, in substantially the same way to achieve substantially the same result. Any alleged differences between

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	the above-described features and the recited element are insubstantial and immaterial to infringement.
19. A subscriber station as claimed in claim 18, wherein said at least one processor is further programmed to maintain the transmit power difference.	*See* analysis of claim 18, which is incorporated herein by reference. As each '174 Apple Accused Product is compliant with technical specifications published by 3GPP and ETSI for UMTS technology, the processor of each '174 Apple Accused Product is further programmed to maintain the previously determined transmit power difference. As noted above, the UE, when receiving a command to scale the transmission power, distributes the increment/decrement among all codes such that ratios are always maintained according to their respective conditions. Hence, the UE, or the processor within the UE, is programmed to maintain a previously determined transmit power difference.